

TABLE 2-21
SUMMARY OF WETLAND AREAS PROXIMATE TO ALTERNATES WITHIN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

Wetland Site	NWI Classification (1)	Plant Community Type	Size Hectares (acres)	Dominant Species	Soil Type (2)	Wetland Hydrology Indicators	FQI	Percent Adventive (3)
3	-	marsh	0.04 (0.11)	Sweet Flag	Sawmill silty clay loam	Abandoned Stream Channel	6.4	36.4
4	-	wet meadow	0.10 (0.24)	Reed Canary Grass	Otter Silt Loam	Abandoned Stream Channel	10.6	26.7
15	-	sedge meadow	0.30 (0.75)	Devil's Beggar-ticks, Tussock Sedge	Houghton muck	Surface Saturation	12.2	16.1
17	-	wet meadow	0.03 (0.07)	Sweet Flag, Quackgrass, Reed Canary Grass, Marshpepper Knotweed	Sawmill silty clay loam	Abandoned Stream Channel	4.9	45.5
20	-	sedge meadow	0.89 (2.21)	Owl Fruit Sedge, Bald Spike Rush, Reed Canary Grass, Broadleaf Cattail	Houghton muck	Surface Saturation	8.1	20.0
23	-	wet meadow	0.07 (0.16)	Bald Spike Rush, Watercress, Fall Panicgrass, Pennsylvania Smartweed	Otter Silt Loam	Surface Saturation	9.1	30.0
24	-	sedge meadow	0.14 (0.34)	Devil's Beggar-ticks, Tussock Sedge	Sawmill silty clay loam	Location Along Stream	10.1	25.0
25	PEMC	wet meadow	0.70 (1.74)	Reed Canary Grass	Sawmill silty clay loam	Seasonally Flooded	5.7	30.0
29	-	wet meadow	0.41 (1.02)	Reed Canary Grass	Otter Silt Loam	Location Along Stream	4.5	50.0
30	-	wet meadow	0.12 (0.29)	Bald Spike Rush, Yellow Foxtail	Otter Silt Loam	Surface Saturation	7.2	53.3

TABLE 2-21 (CONTINUED)
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JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

31	PUBF	wet meadow	0.29 (0.71)	Foxtail Barley, Reed Canary Grass, Pennsylvania Smartweed	Beaucoup silty clay loam	Semipermanently Flooded	0.7	71.4
38	-	floodplain forest	0.32 (0.79)	Boxelder, Garlic Mustard, Bulbous Bittercress, Eastern Narrowleaf Sedge, Jewelweed	Otter Silt Loam	Abandoned Stream Channel	16.8	7.5
41	PUBGh	pond	0.73 (1.81)	Devil's Beggar-ticks, Kentucky Bluegrass, Marshpepper Knotweed	Undetermined	Intermittently Flooded (diked/impounded)	1.2	75.0
42	-	sedge meadow	0.05 (0.13)	Pennsylvania Bittercress, Owl Fruit Sedge, Common Boneset	Otter Silt Loam	Surface Saturation	10.7	19.2
51	-	wet meadow	0.47 (1.17)	Redtop, Nodding Beggar-ticks, Barnard Grass, Reed Canary Grass, Yellow Foxtail	Otter Silt Loam	Surface Saturation	6.4	40.0
55	PUBGx	marsh	0.55 (1.35)	Common Duckweed, Reed Canary Grass, Cursed Buttercup, Broadleaf Cattail	Undetermined	Intermittently Flooded (excavated)	8.6	30.0
56	-	wet meadow	0.20 (0.49)	Cursed Buttercup	Otter Silt Loam	Surface Saturation	2.3	76.9
57	PUBGx	pond	0.22 (0.54)	Eastern Cottonwood, Common Duckweed, Cursed Buttercup	Undetermined	Intermittently Flooded (excavated)	7.4	38.5
58	PEMC	sedge meadow	1.32 (3.26)	Redtop, Tussock Sedge, Hairyfruit Sedge, Bald Spikerush, Jewelweed	Lena Muck	Seasonally Flooded	22	23.3
68	-	wet meadow	0.20 (0.49)	Bald Spike Rush, Fowl Mannagrass	Lena Muck	Surface Saturation	10.7	11.1
69	-	sedge meadow	0.58 (1.43)	Owlfruit Sedge, Common Cow Parsnip, Stinging Nettle	Otter Silt Loam	Surface Saturation	12.7	6.3
71	-	sedge meadow	0.40 (0.98)	Bottlebrush Sedge, Fowl Mannagrass, Jewelweed, Common Duckweed, Reed Canary Grass	Sable silty clay loam	Surface Saturation / Sulfide Odor	22.2	3.4



TABLE 2-21 (CONTINUED)
SUMMARY OF WETLAND AREAS PROXIMATE TO ALTERNATES WITHIN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

79	PUBGh	wet meadow	0.05 (0.12)	Foxtail Barley, Prostrate Knotweed, Yellowcress, Neckweed	Beaucoup silty clay loam	Intermittently Flooded (diked/impounded)	2.8	77.8
83	-	wet meadow	0.03 (0.08)	Great Ragweed, Reed Canary Grass, Pennsylvania Smartweed	Otter Silt Loam	Within Drainageway	4.1	25.0
94	PEMFh	Pond	0.04 (0.11)	Green Ash, Eastern Cottonwood, Curly Pondweed	Undetermined	Semipermanently Flooded (diked/impounded)	9.2	13.3
118	-	sedge meadow	1.03 (2.55)	Eastern Cottonwood, Emory's Sedge, Hairyfruit Sedge, Fowl Mannagrass	Otter Silt Loam	Depression Near Stream	12.9	26.5
120	PUBGh	Pond	1.39 (3.44)	Redtop, Coon's Tail, Jewelweed, Rice Cutgrass	Undetermined	Intermittently Flooded (diked/impounded)	15.6	22.5
143	-	wet meadow	0.09 (0.21)	Redtop, Fowl Mannagrass	Otter Silt Loam	Surface Saturation	11.7	8.0
144	PEMC	sedge meadow	0.88 (2.18)	Tussock Sedge, Green Bullrush	Otter Silt Loam	Seasonally Flooded	15.5	19.0
164	-	wet meadow	0.20 (0.50)	Redtop, Marshpepper Knotweed, Pennsylvania Smartweed	Otter Silt Loam	Within Drainageway	3.4	53.8
168	-	sedge meadow	1.50 (3.71)	Nodding Beggar-ticks, Tussock Sedge, Hairyfruit Sedge, Reed Canary Grass	Otter Silt Loam	Surface Saturation	20	25.5
178	PEMC / PUBGh	sedge meadow	0.91 (2.24)	White Panicle Aster, Hairyfruit Sedge, Jewelweed, Rice Cutgrass	Otter Silt Loam	Seasonally Flooded / Intermittently Flooded (diked/impounded)	7.6	0.0

TABLE 2-21 (CONTINUED)
SUMMARY OF WETLAND AREAS PROXIMATE TO ALTERNATES WITHIN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

183	PUBGh	pond	0.09 (0.22)	Eastern Cottonwood, Peachleaf Willow, Common Duckweed, Reed Canary Grass, Clustered Black Snake Root	Undetermined	Intermittently Flooded (diked/impounded)	15.1	18.4
185	PUBGh	pond	0.37 (0.91)	Reed Canary Grass, Leafy Pondweed	Undetermined	Intermittently Flooded (diked/impounded)	8.5	35.3
192	PUBGh	pond	0.04 (0.09)	Devil's Beggar-ticks, Rice Cutgrass, Common Duckweed	Undetermined	Intermittently Flooded (diked/impounded)	4.9	38.5
196	PUBGh	sedge meadow	0.42 (1.03)	Owlfruit Sedge, Bald Spike Rush, Green Bullrush	Otter Silt Loam	Intermittently Flooded (diked/impounded)	14.2	17.9
209	R4SBF	sedge meadow	1.47 (3.63)	Hairyfruit Sedge, Fox Sedge, Jewelweed, Rice Cutgrass, Green Bullrush	Otter Silt Loam	Semipermanently Flooded	20.8	4.5
1s	-	wet meadow	0.65 (1.61)	Reed Canary Grass	Undetermined (Depleted Matrix with Radoximorphic Concentrations)	Surface Saturation	12.1	17.6
2s	-	sedge meadow	0.65 (1.61)	Bottlebrush Sedge, Tussock Sedge, Broadleaf Arrowhead	Otter Silt Loam	Surface Saturation	14.2	10.0
3s	PUBGx	wet meadow	0.93 (2.30)	Redtop, Fox Sedge	Sable silty clay loam	Saturated Soils/Groundwater Discharge	12.2	32.1
5s	PEMC	sedge meadow	1.39 (3.44)	Redtop, Fox Sedge, Marshpepper Knotweed	Lawson silt loam	Saturated Soils/Groundwater Discharge	17.6	20.0
6s	-	marsh	1.94 (4.79)	Sweet Flag, Jewelweed, Marshpepper Knotweed	Inclusion	Saturated Soils/Groundwater Discharge	13.9	20.0
10s	-	sedge meadow	1.30 (3.21)	Redtop, Hairyfruit Sedge, Fox Sedge, Green Bullrush	Beaucoup silty clay loam	Saturated Soils/Groundwater Discharge	17.1	29.0



TABLE 2-21 (CONTINUED)
SUMMARY OF WETLAND AREAS PROXIMATE TO ALTERNATES WITHIN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

11s	-	wet meadow	2.51 (6.20)	Fox Sedge, Rice Cutgrass, Yellow Foxtail	Lawson silt loam	Surface Saturation	13.8	17.6
13s	-	wet meadow	1.25 (3.10)	Hairyfruit Sedge, Reed Canary Grass	Beaucoup silty clay loam	Surface Saturation	14.2	20.8
14s	-	wet meadow	2.51 (6.20)	Fox Sedge, Common Boneset, Rice Cutgrass	Undetermined	Saturated Soils / Groundwater Discharge	17.3	19.6
17s	-	pond	0.74 (1.84)	Fox Sedge, Rough Barnyard Grass, Rice Cutgrass	Undetermined (Inundated)	Inundated	10.7	23.1
18s	-	wet meadow	0.42 (1.03)	Common Boneset, Rice Cutgrass	Undetermined (Typic Endoaquoll)	Saturated Soils / Groundwater Discharge	10.7	20.7
19s	-	sedge meadow	0.21 (0.53)	Hairyfruit Sedge, Fox Sedge	Sable silt loam	Abandoned Stream Channel	13.7	32.0

Notes: (1) (-): Areas not depicted on the National Wetland Inventory (NWI) Maps.

(2) Identified soil types are considered hydric and occur on the appropriate county list of hydric soils. A soil characterized as "Undetermined" indicates that the site is permanently flooded and that the soil characterization was not done. The soil is considered saturated for a long period of time during the growing season and, therefore, meets the hydric soil criterion.

(3) "Percent Adventive" is defined as the percentage of plants which are not native to the United States.

Source: NRCS, 1996; SCS, 1976; USFWS, National Wetland Inventory Map, IDNR, 1996.



Sedge meadow - Includes areas dominated by sedges on peat, muck, or wet sand that are typically located within pastures. This community type is relatively homogeneous in composition and structure. Some floristic overlap occurs between this cover type and wet meadow. Dominant plants include various species of sedges, boneset, bulrush, and beggar ticks.

Wet meadow -Wet meadows include areas dominated by grasses where soils are hydric. Sites are often associated with disturbed sedge meadows and the ground surface may be uneven from old tussocks of sedges. The dominant plants are reed canary grass, redtop, beggar ticks, boneset, smartweeds, and mannagrass. Wet meadows are frequently found in pastures.

A significant concentration of wetlands occurs in Irish Hollow. The wetlands occur along approximately 8,500 feet of Irish Hollow Creek and the abandoned C&NW Railroad (see Exhibits, Sheets 21 to 23). A total of 20 wetland sites comprising approximately 45 acres occur along this stretch. Individually, the sites range in size from 0.03 hectare (0.07 acre) to 2.77 hectares (6.84 acres) in size. Ten sites have acreages over 0.81 hectare (2.00 acres).

Fourteen of the wetland plant communities are wet meadow, sedge meadow, or a mixture of these two community types. Dominant sedges include hummock sedge, fox sedge and hairy-fruited lake sedge. Dominant grasses include redtop, bluejoint grass and reed canary grass. The sites have above average FQI values for the project area, with seven of the sites having FQI values greater than 20.

The dominant cover type along this stretch of the creek is pasture with an occasional small stand of trees containing mostly boxelder. These wetlands are important sites for various species of birds, amphibians and reptiles. These aspects of the wetlands are discussed in the biological resources section of the document.

2.12 Special Waste

2.12.1 Non-Hazardous Waste/Additional Areas of Concern

A Preliminary Environmental Site Assessment (PESA) was conducted by the Illinois State Geological Survey (ISGS) in 2001 (updated March 2003) along the project corridor for each of the Alternates. This area was characterized as a high risk for the occurrence of hazardous materials based on the presence of volatile organic compounds (VOCs) significantly above background levels in the headspace of soil samples taken from boreholes at the Amoco Pipeline on U.S. Route 20 and Wards Grove Township Garage and Maintenance Facility.

The PESA identified ten properties of environmental concern. The locations of these sites are depicted on the Environmental Inventory Maps in Appendix N. Three of these properties are of concern because there is a registered underground storage tank present.

<u>Site</u>		<u>Location</u>
IDOT Maintenance Yard	(Site 414A-1)	Galena
Eagles Roost Amoco Gasoline Station	(Site 414A-A)	Elizabeth
IDOT Maintenance Yard	(Site 414A-H)	Eleroy

The remaining seven properties could potentially be of concern upon further investigation:

<u>Site</u>		<u>Location</u>
Amoco Pipeline on Buckhill Road	(Site 414A-3)	Galena
Jo Daviess County Highway Department	(Site 414A-C)	Elizabeth



Terrapin Ridge Motel & Restaurants	(Site 414A-D)	Elizabeth
Amoco Pipeline on Vel Terra Road	(Site 414A-4)	Woodbine
Amoco Pipeline on U.S. Route 20	(Site 414A-5)	Woodbine
Former Terra Industries	(Site 414A-E)	Stockton
Township Garage and Maintenance Facility	(Site 414A-6)	Wards Grove

Evidence from aerial photographs, historical topographic maps and site visits indicates that some buildings along the project right-of-way were constructed before 1979 and may therefore have asbestos-containing materials as components in floor tile, wall and pipe insulation, roofing material, patching or paint compounds, ceiling materials and stove/furnace insulation. Asbestos discovered in any buildings to be demolished will require special removal prior to demolition.

2.12.2 Hazardous Waste

The USEPA listing of potential, suspected, and known hazardous waste or hazardous substance sites in Illinois (i.e., the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS)) was reviewed to ascertain whether the proposed project will involve any listed site(s). A database check was conducted on March 5, 2003 of the USEPA CERCLIS Hazardous Waste Sites and the Illinois Environmental Protection Agency (IEPA) LUST sites to re-evaluate the PESAs known as ISGS No. 414. The CERCLIS database was last updated February 12, 2003. No new database changes were found.

2.13 Biological Resources

The project area lies within portions of the Wisconsin Driftless Division and the Freeport Section of the Rock River Hill Country Natural Divisions of Illinois (Figure 2-5). Within the project area, the Driftless Division has also been designated by IDNR as a Resource Rich Area (RRA). The Driftless Resource Rich Area covers approximately 300 square miles in Northwestern Illinois on and around the Mississippi River in Jo Daviess, Carroll, and Whiteside Counties. The project corridor traverses a portion of this area between Stockton and Tapley Woods Conservation Area. The Resource Rich Areas is an Illinois DNR program that identifies large areas containing concentrated natural resources (forests, wetlands, natural areas/nature preserves and biologically significant streams) in order that cooperative public-private partnerships can be formed that merge natural resource stewardship with compatible economic and recreational development.

The Wisconsin Driftless Division was never glaciated during the Pleistocene era and consists of steep rolling hills with erosional features such as stream valleys. Limestone and dolomite occur in the road cuts and are scattered throughout the upland forests. Soils in this division consist of wind-blown loess, thicker on the east side of hills, and thinnest at the top of ridges. In areas of thin soils, bedrock dolomite hill prairies can be found. Most areas within the division have been altered for agricultural purposes to non-native grassland, hay, or row crops.

The Freeport Section includes most of the Rock River Hill Country Division. It is characterized by rolling hills and the presence of dolomite and limestone bedrock. Limestone caves are present. The Rock River Hill Country subsection is an area of steep, dissected topography, which also contains broad outwash plains. Soils are often thin, developed from a recent silt-loam cap of loess over old Altonian- and Illinoian-age glacial drift. Agricultural land and grassland are the predominant cover types.

Biological surveys in the project area were conducted over a period of several years in order to assess wetlands, riverine and upland habitat communities, wildlife resources and the



occurrence of potential habitat for threatened and endangered species. Results of these surveys are summarized in the Ecological Resources Technical Report.

2.13.1 Cover Types/Habitat

The project area covers 272 square kilometers or 27,240 hectares (67,259 acres). Nineteen cover types were mapped within the project area. The cover types and their corresponding acreages are presented in Table 2-22. Agricultural land, hayland and pasture account for 77.1 percent of the lands within the project area. The most common type of natural community in the project area is upland forest which comprises 15.2 percent of the total area. The only other cover type of importance in the project area is prairie, because of its rarity.

Agricultural land - Within Jo Daviess and Stephenson Counties, agricultural land is a significant cover type, representing 27.4 percent and 51.7 percent of the land in each county, respectively. Agricultural fields planted to crops of grains, vegetables, silage and fruits (e.g., corn, soybeans, wheat, oats, sorghum, sunflower, melons, apples and grapes) are included in this cover type. This includes temporarily fallow fields because of season (stubble in winter or wet, unplowed fields in spring) or rotation schedules. Agricultural fields dominated by weeds are still considered cropland, not formland. Landscape nurseries with shrubs and submature trees are included in this cover type.

Pasture/Hayfields - Jo Daviess and Stephenson Counties are also ranked first and second in the amount of rural grassland within each county (46.3 percent and 39 percent, respectively). Dominated by planted forage grasses and legumes, especially smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), fescue (*Festuca pratensis*), and clover (*Trifolium*). Common trees and shrubs are honey locust (*Gleditsia triacanthos*), osage-orange (*Maclura pomifera*), hackberry (*Celtis occidentalis*), and multiflora rose (*Rosa multiflora*). Fields planted in forage grasses and legumes, often timothy (*Phleum pratense*) and alfalfa (*Medicago sativa*) are mapped as hayfields. They are mowed at least annually.

Native grassland (prairie) - This cover type includes prairie, wet prairie, sand prairie, gravel prairie, dolomite prairie, hill prairie, and shrub prairie. Native prairie found in project areas is usually degraded by fire suppression, herbicide spraying, and mowing, and is found as remnant communities in roadsides, pastures, abandoned railroad right-of-ways, and cemeteries. The dominant native grass species include side-oats grama (*Bouteloua curtipendula*), little bluestem (*Schizachyrium scoparium*), and big bluestem (*Andropogon gerardii*). Forbs include sandwort (*Arenaria stricta*), stiff sunflower (*Helianthus rigidus*), purple prairie clover (*Dalea purpurea*), blue-eyed grass (*Sisyrinchium albidum*) and asters (*Aster* spp.). Most of the sites consist of warm-season grasses and disturbance-tolerant forbs persisting amid shrub thickets and exotic grasses. This cover type also includes prairie restorations or successional sites dominated by native prairie grasses, with some native forbs present.

Four native grassland areas were identified within the project area. Table 2-23 summarizes the floristic quality and size of each site. The location of each site is depicted in Figure 2-11.

Upland forest – Forest or woodland cover types represent 19.2 percent of Jo Daviess County (ranked 13th), whereas, Stephenson County has only 4.8 percent (ranked 18th). The percentages of the main cover types in the project area are similar to the percentages for the two counties. Approximately 15.2 percent of the project area contains upland forest (Table 2-24). In general, forested areas within Jo Daviess County occupy 38 percent of the county, while in Stephenson County, they represent 9.5 percent. Most of the forested areas within the overall



TABLE 2-22
SUMMARY OF AREA OF COVER TYPES IN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

Cover Type	Total Area, Hectares (Acres)	Percent of Project Area
Agricultural Land	11,059.1 (27,326.6)	40.6
Pasture	7,594.6 (18,766.1)	27.9
Upland Forest	4,134.5 (10,216.2)	15.2
Hayfield	2,332.4 (5,763.4)	8.6
Developed Land	1,671.5 (4,130.3)	6.1
Shrubland	90.5 (223.7)	0.3
Floodplain Forest	72.9 (180.1)	0.3
Tree Plantation	72.5 (179.2)	0.3
River	38.2 (94.3)	0.1
Native Grassland (Prairie)	37.7 (93.1)	0.1
Wet Meadow	35.1 (86.8)	0.1
Non-native Grassland	32.7 (80.8)	0.1
Pond	28.8 (71.1)	0.1
Fence Row	8.5 (20.9)	>0.1
Marsh	3.4 (8.5)	>0.1
Wet Shrubland	3.0 (7.4)	>0.1
Swamp	1.3 (3.3)	>0.1
Sedge Meadow	6.8 (16.8)	>0.1
Other Hydrological Community	0.4 (1.0)	>0.1

Source: Handel, 1993. The Louis Berger Group, Inc., 2002.

Note: Wetland areas (Wet Meadow, Pond, Marsh, Wet Shrubland, Swamp and Sedge Meadow) that account for 91.6 hectares (226.31 acres) or approximately 0.3 percent of the project area.





TABLE 2-23
SUMMARY OF NATIVE GRASSLAND SITES IN THE PROJECT AREA,
JO DAVIESS AND STEPHENSON COUNTIES, ILLINOIS

Site	Prairie Type	Natural Area Grading	Number of Conservative Species	Size: Hectares (Acres)
1	Dolomite Hill Prairie	Grade A & B	26	5.42 (13.40)
2	Dolomite Hill Prairie	Grade B	23	6.49 (16.03)
3	Dolomite Hill Prairie	Grade B & C	16	4.71 (11.64)
4	Dry Dolomite Hill Prairie	Grade C+	11	1.24 (3.06)

Notes: Conservative species are those that have the tendency to be restricted to natural areas.

Natural Area Grading: A= relatively stable or undisturbed plant community; B= lightly disturbed community; C= moderately to heavily disturbed plant community.

Source: Taft, 1993; The Louis Berger Group, Inc. 2002.

project area occur between Galena and Elizabeth (Jo Daviess County). Along the proposed project corridor, approximately 27 forested areas occur, ranging in size from 8.1 hectares (20 acres) to over 404.7 hectares (1,000 acres). (Twelve areas are 8.1-16.2 hectares (20-40 acres) in size, eight are 16.2-40.5 hectares (40-100 acres) in size, four are 40.5-80.9 hectares (100-200 acres) in size, one is 80.9-242.8 hectares (200-600 acres) in size, and two are 242.8-445.2 hectares (600-1,100 acres) in size.) These forested areas tend to occur on steep-sided hillsides and ridges. These areas are fragmented by pastures, roads, utility lines, and many are currently grazed. The distribution of forested areas in the project area is depicted on the Land Cover Maps (Appendix O).

Upland forests, in northwestern Illinois, are usually dominated by white oak on dry sites and sugar maple and red oak on mesic sites. Forested areas on floodplains are typically dominated by silver maple, American elm and green ash. All of the original forest vegetation in the project area has been altered. Agriculture, logging or cutting for fuel, mining, and more recent housing developments and fire suppression have all impacted the present day forests in the project corridor. Most forests in the corridor are currently being grazed or have been grazed within the last forty years. Because of these past and present disturbances, specific forest sites differ in their species composition, density, size and age class (Table 2-24).

Species composition within each stand varied from four to 13 species and is related to the history of disturbance. A total of 14 stands were each dominated by a different species. Red oak, white oak, bur oak and shagbark hickory each dominated in at least two stands. A total of 23 tree species were sampled in these stands.

Stand density (number of trees per unit area) varied from 236 trees per hectare (96 trees per acre) to 1,020 trees per hectare (413 trees per acre). Size of trees in a stand is measured by Total Basal Area (tree diameters squared per unit area). Size of trees varied from 40 square meters per hectare (174 square feet per acre) to 636 square meters per hectare (2,771 square feet per acre). Taking density and total basal area together, one stand contains a large number



TABLE 2-24
SUMMARY OF FOREST STAND CHARACTERISTICS
IN THE PROJECT AREA

Watershed	Number of Species ¹	Density No./Ha / No./Ac	Total Basal Area m ² /Ha / ft ² /Ac	Dominant Species ²	Age Class ³	Disturbance ⁴
Galena River	8	296/119	206/897	Bur Oak	II	Moderate (G)
Galena River	5	913/370	80/18	Black Locust	I	Heavy (F)
Smallpox Creek	8	671/272	119/518	Red Oak	I	Light (L)
Smallpox Creek	8	377/153	342/1,490	Sugar Maple	I	Light (G)
Smallpox Creek	6	1,020/413	143/623	Bur Oak	II	Light (G)
Smallpox Creek	8	290/117	94/409	Sugar Maple	I	Heavy (G)
Smallpox Creek	13	484/196	130/566	Bur Oak	I	Severe (G)
Smallpox Creek	7	614/249	156/680	American Elm	I	Severe (G, L)
Irish Hollow Creek	5	236/96	44/192	Shagbark Hickory	I	Moderate (G)
Irish Hollow Creek	5	570/231	174/758	White Birch	I	Moderate (G)
Irish Hollow Creek	10	416/168	220/958	Red & White Oak	II	None
Irish Hollow Creek	7	488/198	40/174	White Oak	I	Light (G)
Irish Hollow Creek	10	465/188	103/449	White Birch	I	Light (G)
Irish Hollow Creek	8	514/208	173/754	Shagbark Hickory	II	Light (G)
Long Hollow Creek	5	266/108	636/2,771	Red Oak	II	None
Apple River	9	657/266	75/327	White Ash	I	Moderate (G)
Apple River	4	504/204	92/401	Black Walnut	II	Moderate (G)
Apple River	11	377/153	342/1,490	Sugar Maple	II	None
Apple River	11	247/100	310/1,350	White Oak	II	Heavy (G)
Apple River	10	644/261	136/592	Ironwood	I	Severe (G)
Rush Creek	10	776/314	196/854	Shagbark Hickory	II	Moderate (G)
Yellow Creek	12	700/283	206/897	Bitternut Hickory	II	Light (L)
Pecatonica River	12	551/223	151/658	Wild Black Cherry, American Elm	II	Moderate (G)

¹Number of tree species sampled

²Dominant species represent 25 percent or more of the importance value of a stand.

³Age Class: I=trees 20-40 years in age; II=trees 40-90 years in age

⁴Disturbance: G=grazing; L=logging; F=flooding

Source: Illinois Department of Transportation.



(488 trees/ha (198 trees/ac)) of small-sized trees (40 meters²/ha (174 ft²/ac)). This is reflected in the age (between 20 and 40 years in age) of the stand. On the other hand, one stand has a relatively moderate number (266 trees/ha (108 trees/ac)) of large individuals (636 m²/ha (2,771 ft²/ac)). This is reflected in the age of the stand (40 to 90 years).

Sapling, shrub and herbaceous layers in these forested stands are heavily influenced by grazing (domestic livestock and white-tailed deer). Sapling and shrub layers are greatly reduced in most of the sampled stands. A total of seventeen species of shrubs were sampled in the 23 forested stands. The dominant shrub species was Missouri gooseberry (*Ribes missourienses*). A total of 59 species of herbs were sampled in these stands. The dominant herbs included Virginia creeper, common snakeroot, white avens and Pennsylvania sedge.

Three upland forest sites were identified in the project area that have a Natural Areas rating of B. Only one of these sites, the Tapley Woods Conservation Area (Figure 2-11), occurs within the project area. This forest site is dominated by red oak, white oak, and basswood. This forest tract has a very diverse flora with the best plant diversity occurring in the steep ravines and spring areas. Four populations of drooping sedge, a state threatened species, occurs within this stand. Disturbance within this stand is greatest near existing U.S. 20.

Riparian forest – Riparian forest habitats comprise an extremely small portion of the corridor. Only a few forests near Galena are true riparian habitat. Forest 1b was actually a wet mesic upland forest or terrace forest as classified by the Natural Areas Inventory (White 1978) and is reflected in the species data and the small sample size. Most floodplain forests occur outside of the project corridor toward the Mississippi River or have been converted to crop fields along the Apple and Galena Rivers. Most riparian forest habitat consists of a small band along the stream bank. These are too small to sample and usually consists of monotypic stands of disturbance tolerant species such as boxelder or American elm. Both shrub and herbaceous layers are typical of wet mesic upland forest as well as disturbed floodplain forest.

2.13.2 Invasive Species

Executive Order 13112 directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals that are not native to the continental United States. The Federal Highway Administration (FHWA) has indicated that consideration of invasive species should occur during all phases of the environmental process to fulfill the requirements of NEPA. Approximately 27.5 percent of the state's flora is composed of alien (introduced) plant species. The Illinois Noxious Weed List contains several plant species that occur within the project area. The Department spot sprays the following listed noxious weed patches within the right-of-way: Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), and marijuana (*Cannabis sativa*). In addition, the following nuisance weed patches are also spot-sprayed: teasel (*Dipsacus fullonum*), purple loosestrife (*Lythrum salicaria*), garlic mustard (*Allaria petiolata*), wild carrot (*Daucus carota*), wild parsnip (*Pastinaca sativa*) and chicory (*Cichorium intybus*). It should also be noted that the Department and other state agencies attempt to control nuisance weeds on properties under their jurisdiction.

Invasive or nuisance species can establish themselves in rights-of-way during initial highway construction or afterwards due to maintenance practices. Because the proposed project may be located on new alignment, there is the possibility that it will introduce noxious and nuisance species to areas where they currently do not exist within the ROW. The Department will continue to implement the noxious and nuisance weed control programs along the new ROW.



2.13.3 Wildlife Resources

2.13.3.1 Amphibians and Reptiles

Fourteen species of amphibians and reptiles were observed during the field surveys of the project area. Amphibian species include the American toad (*Bufo americanus*), chorus frog (*Pseudacris triseriata*), spring peeper (*Hyla crucifer*), bullfrog (*Rana catesbeiana*), green frog (*Rana clamitans*), northern leopard frog (*Rana pipiens*), and pickerel frog (*Rana palustris*). Reptiles identified within the project area include snapping turtle (*Chelydra serpentina*), bullsnake (*Pituophis melanoleucus*), milksnake (*Lampropeltis triangulum*), common garter snake (*Thamnophis sirtalis*), brown snake (*Storeia dekayi*), water snake (*Nerodia sipedon*), and timber rattlesnake (*Crotalus horridus*). A few additional common species such as cricket frog (*Acris crepitans*), gray treefrog (*Hyla versicolor*), painted turtle (*Chrysemys picta*), rat snake (*Elaphe obsoleta*), and racer (*Coluber constrictor*) were not encountered during the field surveys, but most likely do occur in the project area.

More than half of the land within the project area is agricultural and the majority of the remaining acreage is in pasture. However, there are still widely scattered areas of suitable habitat for amphibians and reptiles in the project area, particularly in the western portion where the rugged terrain has protected large tracts of land from disturbance. The most significant habitat area for herpetofauna is associated with the Irish Hollow wetlands, as described below.

■ Irish Hollow Wetlands

The Irish Hollow wetland complex (see Exhibits, Sheets 21 to 23) in the southwestern portion of the project area provides suitable habitat for a variety of reptiles and amphibians. This complex of seeps, flooded ditches, cattail marshes, ponds and larger waterbodies parallel Irish Hollow Creek for approximately 3 kilometers (1.9 miles). Seven species of amphibians and reptiles (northern leopard frog, chorus frog, spring peeper, green frog, garter snake, milk snake, snapping turtle) were recorded from this site, the highest number from any site in the project area.

2.13.3.2 Birds

There were 52 species representing 27 families observed during the breeding season. The species with the greatest relative abundance was the blue jay (*Cyanocitta cristata*), followed by the house wren (*Troglodytes aedon*), northern cardinal (*Cardinalis cardinalis*) and American robin (*Turdus migratorius*). The northern cardinal had the highest relative frequency. These bird species are representative of the variety of habitats (forest to pasture) present within the project area, and represent the most abundant species observed throughout the project area. An increase in bird diversity was evident during the spring and fall migration periods as migratory bird species moved through the project area and were recorded in variety of habitats including forest, wetlands, and grasslands.

Because of the large amount of forested areas (Table 2-22) in the project area, large numbers of neotropical migrants would be expected to occur. Neotropical migrants are species of birds that breed in the United States and winter in Latin America. These species are area sensitive and subjected to nest predation and parasitism. Over the past 40 years population decreases of 30 to 70 percent have occurred for most of these species. Within the forested areas of the project area thirteen species of neotropical migrants were identified during the breeding season (yellow-billed cuckoo, white-breasted nut hatch, wood thrush, red-eyed vireo, Kentucky warbler,



common yellow throat, chestnut-sided warbler, blackpoll warbler, hooded warbler, ovenbird, scarlet tanager, American redstart, and yellow-throated vireo).

Common bird species observed within agricultural land and developed land within the project area include the American goldfinch (*Carduelis tristis*), American crow (*Corvus brachyrhynchos*), American kestrel (*Falco sparverius*), house sparrow (*Passer domesticus*), eastern meadowlark (*Sturnella magna*), European starling (*Sturnus vulgaris*), field sparrow (*Spizella pusilla*), mourning dove (*Zenaida macroura*), rock dove (*Columba livia*), brown-headed cowbird (*Molothrus ater*), common grackle (*Quiscalus quiscula*), northern cardinal, red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*) and wild turkey (*Meleagris gallopavo*). Census results for Hill prairies indicated that these habitats are utilized predominantly by nine species for breeding, which include American robin, black-capped chickadee (*Parus atricapillus*), cedar waxwing (*Bombycilla cedrorum*), field sparrow, gray catbird (*Dumetella carolinensis*), indigo bunting (*Passerina cyanea*), northern cardinal, purple finch (*Carpodacus purpureus*) and song sparrow (*Melospiza melodia*).

Upland and bottomland forests census results provided similar results for the breeding season, with the most common species including American robin, black-capped chickadee, blue jay, house wren, northern cardinal, and white-breasted nuthatch (*Sitta carolinensis*). Other species associated with the forest, including downy woodpeckers (*Picoides pubescens*), eastern wood pewee (*Contopus virens*), northern flicker (*Colaptes auratus*), ovenbird (*Seiurus aurocapillus*) and scarlet tanager (*Piranga olivacea*) were recorded, though at a lower frequency.

Several important bird habitat areas were identified within the project area during the course of the census. These areas are described below.

■ **Irish Hollow Wetlands**

The Irish Hollow wetlands complex (see Exhibits, Sheets 21 to 23) provides habitat for wetland-dependent bird species. Although wetlands make up a small percentage of the total acreage of the project corridor, the Irish Hollow wetlands form an extensive wetland complex comprised of marsh, sedge meadow and wet meadow habitats along an abandoned railroad right-of-way. A total of 26 species representing 16 families were recorded at this site during the breeding season. Such characteristic species as the eastern meadowlark, killdeer, red-winged blackbird, Canada goose, mallard and green-backed heron were observed in this wetland complex.

■ **Great-Blue Heron Rookery**

One active great-blue heron (*Ardea herodias*) nesting colony (see Exhibits, Sheet 93) was located within the project area in a large isolated upland forest near Yellow Creek. This area was discovered in the winter of 1993-94 and Great-blue Herons were observed actively using the rookery in the summer of 1994. Six standing nests were located at the highest point in this area in dead shagbark and pignut hickory trees.

■ **Tapley Woods Conservation Area**

Twenty-four species from 10 families were observed during the breeding season in Tapley Woods. Tapley Woods had the highest concentration (11 species) of Neotropical migrants during the breeding season. Six species of wood warblers including the Kentucky warbler (*Oporornis formosus*), common yellowthroat (*Geothlypis trichas*), chestnut-sided warbler (*Dendroica pensylvanica*), blackpoll warbler (*Dendroica striata*), hooded warbler (*Wilsonia citrina*) and ovenbird were confirmed as breeding species.



2.13.3.3 Mammals

Agricultural land interspersed with woodland, shrubland and grassland will provide habitat for a variety of common wildlife species. Most of the recorded species are habitat generalists (Hoffmeister 1989). Twenty-four mammal species were observed within the project area. The Virginia opossum, eastern cottontail, fox squirrel, coyote, raccoon and white-tailed deer were observed in both forested and agricultural areas and appeared to be widespread throughout the project area. White-tailed deer appeared to be very abundant in the western portion of the project area where forest cover is more extensive. Other common species observed include the striped skunk, gray squirrel, woodchuck, red fox, beaver, meadow vole, and muskrat. The white-footed mouse (*Peromyscus leucopus*) was the most frequently observed small mammal species throughout the project area. The northern short-tailed shrew (*Blarina brevicauda*) and the eastern chipmunk (*Tamias striatus*) were also frequently observed.

Two relatively rare sightings of gray fox (*Urocyon cinereoargenteus*) and least weasel (*Mustela nivalis*) were recorded in the western portion of the project area. The least weasel would be limited to agricultural areas whereas the gray fox would occur only in forested areas. Large numbers of little brown bats (*Myotis lucifugus*) were observed, along with fewer numbers of the big brown bat (*Eptesicus fuscus*) and the eastern pipistrelle (*Pipistrellus subflavus*).

A wildlife movement (or dispersal) corridor has been defined as a linear habitat the primary function of which is to connect two or more significant areas of habitat. A corridor may be used by resident individuals, but it must be used by animals for travel, dispersal, or migration. Corridors are important because they facilitate genetic interchange among individuals, allow populations to shift their ranges in response to environmental changes or disasters, and enable individuals to recolonize habitats where local extirpation of a population has occurred. Corridors are especially important in landscapes where natural habitats have been highly fragmented. No wildlife corridors were identified in the project area. The movements of white-tailed deer are most common during the autumn (breeding season) and spring (dispersal of yearlings, especially males). In the Midwest white-tailed deer typically occupy different ranges during the summer and winter, congregating in sheltered wintering sites that are often in areas of dense forest cover. Because so much forest cover is present, no deer wintering sites have been identified. Therefore, no specific migration routes are likely to occur in the project area. White-tailed deer movements within the project area occur between forest tracts and adjacent agricultural fields.

2.13.4 Threatened and Endangered Species

2.13.4.1 Federally-Listed Species

The U.S. Fish and Wildlife North Central Region "Redbook" dated March 22, 2001 lists the bald eagle, Indiana bat, Iowa Pleistocene snail, Karner blue butterfly and Higgins' eye pearly mussel, and Eastern prairie fringed orchid as occurring in Jo Daviess and/or Stephenson Counties, Illinois.

The bald eagle (*Haliaeetus leucocephalus*) is known to nest in Jo Daviess County and is a common winter migrant along the Mississippi River. During the fall and winter avian surveys, two bald eagles were observed in the project area. One observation occurred near the Galena Oaks Subdivision between Elizabeth and Woodbine, the other, at Smallpox Creek south of Galena. Both observations are of soaring individuals and these individuals are considered migrants. There are no nesting sites within the project area. The proposed project will not impact the bald eagle.



The Iowa Pleistocene snail (*Discus macclintocki*) occurs on north facing algific talus slopes in southwestern Jo Daviess County. This type of habitat does not occur within the project area. The proposed project will not impact the Iowa Pleistocene snail.

The Karner blue butterfly (*Lycaeides melissa samuelis*) potentially could occur in Jo Daviess County. Habitat for this species consists of pine barrens and oak savannas on sandy soil containing wild lupines (*Lupinus perennis*) which is larval food for the butterflies. Some areas within the project area could be considered oak savanna, but they do not occur on sandy soils. Wild lupines have not been identified in the project area during the botanical field surveys conducted between 1993 and 1996. The proposed project will not impact the Karner blue butterfly.

The Higgins eye pearly mussel (*Lampsilis higginsii*) is a species found in large rivers. The species is known to occur in the Mississippi River of Jo Daviess County. There is no suitable habitat for this species within the project area. The proposed project will not impact the Higgins eye pearly mussel.

The Eastern prairie fringed orchid (*Platanthera leucophaea*) has occurred in Jo Daviess and Stephenson Counties. The species occurs in mesic to wet prairies. Mesic to wet prairies were not identified in the project area. This species was not identified during the botanical field surveys conducted in the project area between 1993 and 1996. The proposed project will not impact the Eastern prairie fringed orchid.

During the winter Indiana bats (*Myotis sodalis*) congregate in a relatively small number of caves and abandoned mines for hibernation. Indiana bats are more widely dispersed during the summer. Female Indiana bats form maternity colonies under slabs of exfoliating bark of dead trees or beneath exfoliating bark of live shagbark hickories during May to August. Maternity roost trees occur in both upland and floodplain forests. Riparian and floodplain forests are thought to provide optimal foraging habitat for this species.

Currently, the only Indiana bat hibernaculum in northern Illinois is an abandoned mine in LaSalle County. There is a winter record for the Indiana bat from a lead mine 13 Km (8 miles) southeast of Galena, but it is from 1953. During February 1988 two caves, eleven abandoned mines and a railroad tunnel in Jo Daviess County were investigated and no hibernating Indiana bats were found. No caves or mines that would be suitable as Indiana bat hibernacula are located along the proposed project alignments.

In recent years Indiana bats have been found in 22 Illinois counties during the summer. However, they have not been caught north of Henderson County and consequently there are no summer records for Jo Daviess and Stephenson Counties. Six nights of mist netting during July and August 1993 and June 1994 resulted in the capture of 92 bats (big brown bat, little brown bat, eastern pipistrelle) from several sites (Irish Hollow Creek, Smallpox Creek, East Fork Galena River, Furnace Creek, Yellow Creek) within the project area. No Indiana bats were captured. Mist netting had also been conducted on the Apple River at Apple River Canyon State Park (north of the project area) in Jo Daviess County on August 7, 1989. Thirty-five bats of four species were captured, but no Indiana bats.

Based on the above information it has been determined that the proposed project will not impact the Indiana bat.



2.13.4.2 State-Listed Species

The Illinois Endangered Species Protection Board lists a number of animal and plant species as occurring in Jo Daviess, Stephenson and adjacent counties. Field surveys within the project area between 1993 and 1999 have identified the northern harrier, peregrine falcon, brown creeper, river otter, timber rattlesnake, drooping sedge (*Carex prasina*) and redroot (*Ceanothus herbaceous*) as occurring within the project area.

The northern harrier (*Circus cyaneus*), an Illinois endangered species, was observed during the breeding season. It is possible that the northern harrier is breeding in the Irish Hollow Area. It was observed there in three seasons (spring, breeding and fall), however, no evidence was found of a Harrier nest in the project area.

The peregrine falcon (*Falco peregrinus*), which is state endangered, was observed during migration and is anticipated to be a transient species within the project area during the spring and fall migrations. The proposed project is not anticipated to affect this species.

The state-threatened brown creeper (*Cerithia americana*) over winters in the forested areas within the project area. This species was observed during the fall, winter and spring seasons, but was absent during the breeding season. Breeding habitat consists of relatively mature stands of floodplain forest containing dead trees with peeling bark. The lack of breeding records and the small amount of floodplain forest (Table 2-22) in the project area makes it unlikely that the species breeds in the project area. The project will not impact this species.

In Illinois, river otters, which are listed as threatened by the State of Illinois, have been found in shallow lakes, sloughs, rivers, streams, drainage ditches and ponds. It appears that important features of high quality river otter habitat are extensive riparian forests (or emergent wetland vegetation), good water quality and healthy fish populations, the presence of suitable den sites (such as log piles), open water during winter, and a minimal amount of human disturbance (Anderson and Woolf 1984). River otters require large home ranges that may include 80 to 160 km (50 to 100 miles) of riverine channel or shoreline.

However, at any time only a portion of the range is used. The main breeding population of river otters in Illinois occurs along the Mississippi River in Whiteside, Carroll, and Jo Daviess Counties (Herkert 1992). This area is approximately 5 or more miles from the project corridor. River otters were observed along the Galena and Apple Rivers and Smallpox and Yellow Creeks.

During the spring, females with nursing young restrict their activity to small areas near their dens; otherwise resident otters have lengthy home ranges and shift their activity centers frequently. Therefore, otters living on the Galena River or Smallpox Creek would be utilizing several kilometers (miles) along the waterway rather than a single location. Because river otters travel great distances when dispersing, transients could be found on any creek within the project area.

A few sightings of river otters have been made in the project corridor between 1993 and 1996. No den sites were observed. The stream crossings of the Galena, Smallpox, Apple and Yellow Creeks occur on stream segments with a small or absent woody riparian habitat and a floodplain dominated by agricultural land (see Exhibits, Sheets 5, 10, 32 and 94). Otters traverse the area streams on their way to more suitable habitat than that found in the project area. Work in the streams within the project area consists of bridging the streams and most of their floodplains. All of the Alternates would have similar build outs. The proposed project is not expected to impact the river otter or its habitat.



The state-threatened timber rattlesnake (*Crotalus horridus*) is a venomous snake that usually occupies three distinct habitats: heavily forested areas for foraging (summer), south or west facing rock outcrops or talus slides containing deep cracks and fissures for denning (fall to mid-spring), and more open woods, fields and other disturbed habitats when moving between these two habitats (fall and spring). In addition, gravid females may occupy rocky open sites close to the den for gestation and birthing (summer). The activity period in northern Illinois is probably early April to October. Timber rattlesnakes have been identified in two areas; south of Tapley Woods and Snipe Hollow. A 2.41 kilometer (1.5 mile) radius and an additional 1.6093 kilometer (1.0 mile) buffer area have been drawn around the den locations and these are depicted in Figure 2-12.

Four populations of the state-threatened drooping sedge was observed bordering a spring-fed stream within the Tapley Woods Conservation Area (Figure 2-11). This sedge was not discovered in Illinois until about 30 years ago. With the addition of this site, a total of four populations in four Illinois counties; the nearest to the Jo Daviess County station is over 256 km (160 miles) south in Adams and Brown Counties. Including this population, all four known Illinois populations occur associated with springs, suggesting dependence in this extreme portion of the species' range on spring-fed, silt-free, small stream habitats. The proposed project is not anticipated to impact the drooping sedge.

Three stems of Inland New Jersey Tea, a small shrub and a state-endangered plant species, were observed in a dry, rocky, dolomite prairie (Site 1 of Table 2-23 and Figure 2-11). This species is primarily restricted in Illinois to deep sand deposits where it is reported from five stations in five northern Illinois counties. This population and a Winnebago population appear to be the only occurrence in Illinois from rocky upland habitat. This species ranges primarily throughout the Great Plains where it occurs in both rocky and sandy prairie, and extends to the northeastern United States where it is evidently uncommon. The proposed project will not impact the Inland New Jersey Tea.

2.13.5 Land and Water Reserves/Natural Areas

An Illinois Natural Area is an area of land in public or private ownership that has been identified by the Illinois DNR as having a significant natural feature. Significant features include high quality natural communities, endangered species sites, relict species sites, outstanding geologic and aquatic areas, or unique natural features, such as caves. One of these areas occurs within the project area. The Horseshoe Mound Geological Natural Area occurs 1 mile east of Galena (see Exhibits, Sheet 7). Approximately 16 acres of this site is considered to be an outstanding example of a driftless area mound containing dolomite outcrops and a dolomite cliff community. The project will not impact this area.

The Register of Land and Water Reserves constitutes a land and water protection program wherein lands and waters supporting significant natural heritage resources or archaeological resources are recognized and provided protection and management commensurate with the intent of the public in their long term protection and stewardship. Tapley Woods Conservation Area, owned and managed by the Illinois Department of Natural Resources, was registered as an Illinois Land and Water Reserve by the Illinois Nature Preserve Commission on August 3, 1999. This 259 acre reserve consists of upland, slope, and ravine forest, with dolomite bedrock outcrops and associated springs. It is one of the best examples of the original upland and ravine forest of the Wisconsin Driftless Area of Illinois under state ownership. Tapley Woods supports breeding populations of area-sensitive forest wildlife species (neo-tropical migrants) and provides opportunities for hiking, nature study, wildlife watching, research and hunting.





Tapley Woods is bisected by U.S. Route 20, with approximately 172 acres of mesic upland forest with steep ravines, springs and seeps occurring on the northeast side of the highway. This tract has a very diverse flora including one state-listed species (*Carex prasina*) and several rare plant species. Approximately 87 acres of dry upland forest occurs on the southwest side of the highway and is slightly more disturbed and lacks springs and seep complexes. Although the ravines are similar in plant composition to the eastern side, the upland forest slopes are drier.

2.14 Visual/Aesthetics

2.14.1 The Visual Impact Assessment Process

The visual impact assessment for the proposed project was conducted in accordance with the *Visual Resource Inventory Manual Handbook 8410-1 of the Visual Resource Category* guidelines as published by the Bureau of Land Management (BLM). These guidelines serve to establish the methodology used to inventory and analyze the existing conditions within the project corridor and assess the impacts of the proposed project. These guidelines are also consistent with the American Association of State Highway and Transportation Officials (AASHTO) Highway Subcommittee on Design's *Guide for Transportation Design and Environmental Design*.

Two initial assessments were undertaken in September 1992 and October 1996 by the Department to assess the preliminary Freeway and Expressway Alternates. The purpose of these assessments was to evaluate the extent of potential visual impacts each of the proposed preliminary alignments would create within the project area and to identify general corridor location options for further consideration. As a result of these preliminary assessments, several areas of concern were identified and, subsequently, alternative corridors were proposed that would limit the potential impacts to the existing visual character. In December of 1998, fieldwork was conducted to establish the framework and baseline for evaluating the alternative corridors.

The diagrams below present an overview of the BLM methodology used in this assessment. Most of the mapping and modeling presented in the inventory and impact analyses was completed with the aid of a Geographic Information System (GIS). The photo-simulations were created using computer generated three-dimensional models to assure a quantifiable and accurate analysis.

2.14.2 Visual Environment of the Project Area

The project area was virtually untouched by the glaciers that altered most of the surrounding areas. This created a unique landscape of rolling hills nestled among agricultural fields and forested areas. As a result, the project area has a distinct visual character that has made U.S. Route 20 a popular and interesting scenic route.

The project area consists of three distinct landscape zones that are established by major physiographic differences in topography and vegetation. These zones are identified in Figure 2-13 and are described as follows:

- Landscape Zone Type 1 - Upland Ridges and Hollows

Between the city of Galena and Woodbine, the landscape consists of steep ridges and deep, narrow valleys. Farming is generally restricted to valley bottoms and ridge tops, with woodlands being predominate on most hillsides and also in the smaller valleys. In some areas, hillsides feature a savannah-like cover of grassland and deciduous trees. Outcrops of Niagara limestone are common and add to the visual character of the region. Distant views from ridge tops contrast with, the sense of enclosure of the valleys. This landscape unit has significant scenic

